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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/704,641	11/01/2000	Maximilian Albert Biberger	SSI-00700	4503

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EXAMINER

KACKAR, RAM N

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 10/25/2002

17

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/704,641

Applicant(s)

BIBERGER ET AL.

Examiner

Ram N Kackar

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 October 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25, 29 and 30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25, 29 and 30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 11-13.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 1763

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-25, 29 and 30 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Specifically, the applicant has not disclosed the details of claimed structural improvements over the high pressure or supercritical modules of the prior art to integrate the claimed supercritical module to a cluster tool. For example, the structural improvements to eliminate cross contamination and gas leakage are not described.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-10, 13, 15-17, 19-20, 22-25 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (US Patent 6110232) in view of Fujikawa et al (US Patent 5979306).

Art Unit: 1763

Chen et al disclose a transfer module (Fig1-20) having an entrance (attached to load locks 12 and 14), a non-supercritical module coupled to the transfer module (Fig3-32), a transfer mechanism coupled to the transfer module which is configured to move the work piece between the entrance, and any other processing module coupled to it (Fig 3-28), means for injecting inert gas like nitrogen to allow the pressure in the transfer chamber to be slightly positive (Col 2 line 22-25), two hand off stations (Fig 3-14 and 12) adapted in two load locks at the entrance of the transfer module, non supercritical module to be a semiconductor module of the type of an etch, PVD or CVD (Col 1 line 14-21), the transfer mechanism to be a central robot (Fig 3-28) adapted in a circular configuration, the robot arm to comprise an extendable arm and an end effector (Fig 3-28) and the transfer module to be vacuum capable (Fig 1-20).

Chen et al do not disclose a supercritical module connected to the transfer module.

Fujikawa et al disclose a module capable of doing supercritical processing (Col 1 line 9-14), comprising a pressure vessel (Col 3 line 21), a work piece cavity (Fig 4-5) for holding a work piece during processing, ingress and egress for the work piece (Fig 2-14), placement of the work piece in the work piece cavity through the transfer mechanism (Col 7 line 25-29), a pressurizing means for the supercritical processing module (Fig 4-26 and Col 8 line 12-25) and sealing means (Fig 1B-9 and Col 5 line 44) for the entrance of the supercritical processing module.

Therefore it would have been obvious to one having ordinary skill in the art at the time invention was made to couple the supercritical module to the transfer module of Chen et al to combine supercritical processing step with other processing on a wafer without taking the wafer out of clean environment between steps and to have higher throughput.

Art Unit: 1763

With regard to claim 20 the limitation of using CO₂ is directed to an intended use and does not structurally distinguish over Fujikawa. As discussed above, the means to pressurize are disclosed by Fujikawa (Fig 4-26 and Col 8 line 12-25).

With regard to claim 25, it is well known in the art that controlling means are integral part of transfer mechanisms such as robots as is disclosed by Shirai (US Patent 6186722 – Fig 5).

Claim 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (US Patent 6110232) in view of Fujikawa et al (US Patent 5979306) as applied to claim 8 and further in view of White et al (US Patent 6235634).

Chen et al do not disclose the transfer mechanism to comprise a track configuration. White et al disclose a robot on a track configuration (Fig 2 and Col 6 lines 30-59).

Therefore, it would have been obvious to one having ordinary skill in the art at the time invention was made to replace the circular configured robot of Chen by track configured robot of White to get an unrestricted placement of processing modules along the track in an economical way.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (US Patent 6110232) in view of Fujikawa et al (US Patent 5979306) as applied to claim 13 and further in view of Hunter (US Patent 6244121).

Chen et al do not disclose dual arm and end effector.

Hunter discloses a robot having dual arm and dual end effector (Fig 5).

Therefore, it would have been obvious to one having ordinary skill in the art at the time invention was made to replace the single arm robot of Chen by a dual arm robot of Hunter to increase the throughput.

Art Unit: 1763

Claims 18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (US Patent 6110232) in view of Fujikawa et al (US Patent 5979306) as applied to claim 16 and further in view of Jevtic (US Patent 5928389).

Chen et al do not disclose an antechamber coupling the transfer module and the supercritical process module.

Jevtic discloses a combination of a process chamber and an additional robot adapted to be disposed between the transfer chamber connected to the load locks and one or more process chambers which could be the supercritical module (Fig 1 112 could act like the ante chamber robot and any one of the process modules around it could be a supercritical module).

Therefore it would have been obvious to one having ordinary skill in the art to place a module with processing and transferring capabilities so as to be able to do any pre-processing needed before placing in the supercritical module.

Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maydan et al (US Patent 5882165) in view of Fujikawa et al (US Patent 5979306). Maydan discloses a hand off station (Fig 1-14), several non-supercritical modules coupled to the hands off station, a transfer mechanism configured to move the work piece between the entrance and the modules coupled to it.

Maydan et al do not disclose a supercritical module coupled to the hand off station.

Fujikawa et al discloses a module capable of doing supercritical processing (Col 1 line 9-14).

Therefore it would have been obvious to one having ordinary skill in the art to couple the supercritical module to the transfer module of Chen et al to combine supercritical processing step

Art Unit: 1763

with other processing on a wafer without taking the wafer out of clean environment between steps.

Response to Amendment

Applicants amendments filed on 10/7/2002 and the declaration of Dr. Mehrdad Moslehi under 37 C.F.R. § 1.132 have been considered but not found to be persuasive to overcome the rejections under 35 U.S.C. 112 and 103 in the last office action. Examiners response to Dr Moslehis declaration is stated below.

1 Paragraph 13: The declarant asserts that engineering and design considerations associated with cluster tools having supercritical processing modules is substantially different from the ones having non-supercritical process modules. This appears to be inconsistent with what is asserted in paragraphs 22-25. Moreover, those engineering and design considerations have not been disclosed.

2 Paragraph 14: Contrary to declarant's assertion the specification discloses the operational issues but does not disclose engineering and design issues related to supercritical module which make it distinctly and substantially different from non-supercritical modules.

3 Paragraph 15 and 30: One of ordinary skill in the art would have found enough motivation and expectation of success to combine the teachings of Fujikawa and Chen to produce the cluster tool recited in claim 1 for the following reasons.

1 Because the process modules in a cluster tool platform interact to each other only through the transfer module, the success of integrating a process module to a cluster tool platform depends essentially, on how it could integrate with the transfer module.

Art Unit: 1763

2 Fujikawa discloses a module, which is capable of doing supercritical processing (Col 1 line 9-10), being capable to be interfaced to a robot arm in a vacuum chamber (a transfer module)(Col 7 line 25-26) and having short load/unload time (Col 1 line 60-62).

3 Chen discloses a general-purpose cluster tool (Col 1 line 43).

Therefore it is obvious that there would have been a great expectation of success in combining Fujikawa with Chen. Regarding motivation to combine; there has been an industry wide trend for manufacturers to move away from stand alone to cluster tool integrated modules wherever technical, process or economic justification allowed, for the obvious advantages of through put and lack of contamination. There are/were numerous cluster tool platforms where Fujikawa module could be integrated.

Paragraph 16: Again, contrary to declarant's assertion, the specification does not teach how to reliably integrate high pressure (supercritical) and low pressure (non-supercritical) processing modules on a cluster tool platform. On the other hand operational issues have been disclosed extensively.

Paragraph 17: As per declarant's definition, an ante-chamber is a buffer or isolation chamber, identified more by its disposition than by its special characteristics. The transfer chamber (Fig 1-112) disposed between (116) and a process chamber (110) as disclosed by Jevtic could function as an ante-chamber.

Paragraph 18: As stated before in discussion for paragraph 15 Fujikawa discloses a module, which could be integrated to a transfer module. The declarant has stated that Fujikawa

Art Unit: 1763

discloses requirements for eliminating gas leakage and seal failure. These would be desirable requirements in a supercritical module to have (See Paragraphs 27, 28, 29 and 31).

Paragraph 19: Contrary to declarant's assertion Chen discloses a cluster tool and absent any special attributes could integrate with Fujikawa's supercritical module.

Paragraph 20-21: Fujikawa has disclosed a supercritical module, which could work with a robot in a vacuum chamber. Applicant has not provided a reason why Fujikawa's supercritical module could not work with Maydan's or Jevtic's cluster tool.

Paragraph 22-25: In trying to overcome the 35 USC §112 first paragraph rejection, the declarant has asserted that the structural design requirement for the non-supercritical and supercritical high pressure processing systems were essentially similar. This assertion is inconsistent with what is stated in paragraph 13 and further in paragraph 26.

Paragraph 26: The declarant has referred to the need of motivation for combining two different type of modules on a common cluster tool platform since this presented special engineering challenges. Again, applicant has not disclosed how those challenges are overcome.

Paragraphs 27-29: The declarant has emphasized the importance of eliminating gas leaks and asserted that the combination of Chen and Fujikawa will not work. This is not consistent with the assertion in paragraph 18.

Paragraph 31 and 32: The declarant and applicant have assumed the ante-chamber to be a very small volume. This is a new matter as there is no disclosure of this in the specification or the claim. Moreover, "very small volume" is indefinite.

Paragraph 33: The declarant has raised the same issue, which has been addressed before.

Conclusion

2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 703 305 3996. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703 308 1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9310 for regular communications and 703 872 9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0661.


GREGORY MILLS
SUPERVISORY PATENT EXAMINER
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